

# An Analysis of Danish Free Relatives

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Proceedings of the 19th International Conference on  
Head-Driven Phrase Structure Grammar

Chungnam National University Daejeon

Stefan Müller (Editor)

2012

CSLI Publications

pages 45–63

<http://csli-publications.stanford.edu/HPSG/2012>

Bjerre, Anne. (2012). An Analysis of Danish Free Relatives. In Stefan Müller (Ed.): *Proceedings of the 19th International Conference on Head-Driven Phrase Structure Grammar, Chungnam National University Daejeon* (pp. 45–63). Stanford, CA: CSLI Publications.

## Abstract

This paper presents an analysis of Danish free relative constructions. Following Bresnan and Grimshaw (1978) we will adopt a *wh*-head (in Danish *hv*-head) analysis where the *hv*-phrase is the head of an NP. Also following Bresnan and Grimshaw (1978) we will propose an analysis which does not involve a filler-gap dependency between the *hv*-phrase and the gap in the sister clause. Instead we will propose that the gap in the sister clause is bound off by a constructional constraint. In this way the analysis will be shown to differ from previous HPSG *wh*-head analyses of free relatives.

## 1 Introduction

In this paper we present an analysis of Danish free relative constructions. Bresnan and Grimshaw (1978) put forward an analysis of English free relatives which proposes that English free relative clauses are not clauses, but rather the *wh*-phrase is base-generated as the head sister of a clause in an NP. Importantly they do not assume a filler-gap dependency between the *wh*-phrase and the gap in the sister clause. Instead the rule of “Controlled Pro Deletion” accounts for the gap.

The *wh*-head analysis has been adopted into various HPSG analyses of free relatives, cf. e.g. Kim (2001), Wright and Kathol (2003), Kubota (2003), Taghvaipour (2005) and Borsley (2008). In contrast to the analysis in Bresnan and Grimshaw (1978), these analyses account for the gap in free relatives by assuming a filler-gap dependency between the *wh*-phrase and the gap in the sister clause.

In this paper we argue for an HPSG analysis of Danish free relatives which sets itself apart from the previous HPSG *wh*-head analyses in that the *wh*-phrase, or *hv*-phrase, does not bind off the gap in the sister clause, and hence there is no filler-gap dependency relation between the *hv*-phrase and the gap in the sister clause. In this respect our analysis resembles that of Bresnan and Grimshaw (1978). We base our analysis on the distribution of the expletive *der*, ‘there’, and the complementizer *som* in Danish free relatives.

## 2 Free relatives vs. interrogatives

The example in (1), taken from Müller (1999, p. 83) who in turn has taken them from Eisenberg (1986), illustrates the difference between a free relative and an interrogative.

- (1) Ulla weiß, was Egon vermutet.  
Ulla knows what Egon suspects

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<sup>†</sup>I thank participants at the Third International Workshop on Germanic Languages held in Berlin March 2012 and the reviewers and audience at the 19<sup>th</sup> HPSG conference in Daejeon for their valuable comments and discussions. Special thanks to Stefan Müller for his detailed comments and discussion of the paper.

The example has two readings. On one reading, Egon suspects that a certain team won the soccer match, but Ulla knows which team won. On the second reading, Egon suspects that a certain team won the soccer match, and Ulla knows which team Egon suspects won.

Syntactically, we can also distinguish free relatives from interrogatives. In (2a) the free relative is shown not to allow clefting, whereas the interrogative in (2b) does allow clefting.

- (2) a. \*During the week he eats what it is that they serve at daycare for breakfast and lunch.
- b. I stepped to the door, and inquired what it was that they wanted.

Another difference is shown in (3). The non-specific pronouns do not appear in interrogatives, only in free relatives, cf. also Bresnan and Grimshaw (1978, p. 334).

- (3) a. During the week he eats whatever they serve at daycare for breakfast and lunch.
- b. \*I stepped to the door, and inquired whatever they wanted.

Also, free relatives do not allow extraposition from *it* as shown in (4b), whereas extraposition is allowed with interrogatives as in (4d), cf. also Kim (2001, p. 38).

- (4) a. Hvad der er tilbage er blevet dårligt.  
what there is left is become bad  
'What is left has gone bad.'
- b. \*Det er blevet dårligt hvad der er tilbage.  
it is become bad what there is left
- c. Hvem der har opfundet brillerne er tvivlsomt.  
who there has invented glasses.DEF is debatable  
'Who invented the glasses is debatable.'
- d. Det er tvivlsomt, hvem der har opfundet brillerne.  
it is debatable who there has invented glasses.DEF  
'It is debatable who invented the glasses.'

And finally, in (5a) the verb *owned*, which requires an NP subject, can occur with a free relative subject and in (5b) the verb *ate*, which requires an NP object, can occur with a free relative object, cf. also Bresnan and Grimshaw (1978, p. 335) and Kim (2001, p. 37). On the other hand, the verbs do not take interrogative complements as shown in (5c) and (5d).

- (5) a. Whoever said diamonds are a girl's best friend never owned a horse.
- b. They ate what they could find and afford.
- c. \*Whose friend said diamonds are a girl's best friend never owned a horse.

- d. \* They ate whose food they could find and afford.

These distributional properties suggest that free relatives are NPs from an external point of view, rather than clauses.

### 3 The Danish data

The examples in (6) are free relatives where the referent of the free relative pronoun is the same as the “missing” subject of the verb in the sister clause.<sup>1</sup>

- (6) a. Hvem, der synder og kommer i Ilden, vil ikke blive i den  
 who there sins and comes in fire.DEF will not stay in it  
 for evighed.  
 for eternity  
 ‘Who sins and go to Purgatory will not stay there forever.’  
 b. I 1-2 års alderen spiser barnet hvad der serveres.  
 in 1-2 years age.DEF eats child.DEF what there serve.PRES.PAS  
 ‘At the age of 1-2 the child eats what is served.’

In (7) the referent of the free relative pronoun is the same as the “missing” object of the verb in the sister clause.

- (7) a. Ministeren forsømmer ingen lejlighed til at udpege, hvem  
 minister.DEF neglects no opportunity to to point out whom  
 han taler om.  
 he talks about  
 ‘The minister does not neglect any opportunity to point out whom he is talking about.’  
 b. Hun spiser hvad hun får serveret.  
 she eats what she gets served  
 ‘She eats what she is being served.’

In (8) the referent of the non-specific free relative pronoun is again the same as the “missing” subject of the verb in the sister clause.

- (8) a. Vi er altid parat til at gå i dialog med hvem som helst  
 we are always ready to to enter into dialog with whomever  
 der accepterer de demokratiske spilleregler.  
 there accepts the democratic rules  
 ‘We are always ready to enter into a dialogue with anybody who accepts the rules of democracy.’

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<sup>1</sup>All examples are authentic examples from the Web.

- b. I modsætning til mange andre spirituosa kan vodka  
 in contrast to many other spirits can vodka  
 produceres af hvad som helst der kan  
 produce.PRES.PASS of whatever there can  
 forgæres.  
 ferment.PRES.PASS  
 ‘In contrast to many other spirits vodka can be produced from any-  
 thing that can be fermented.’

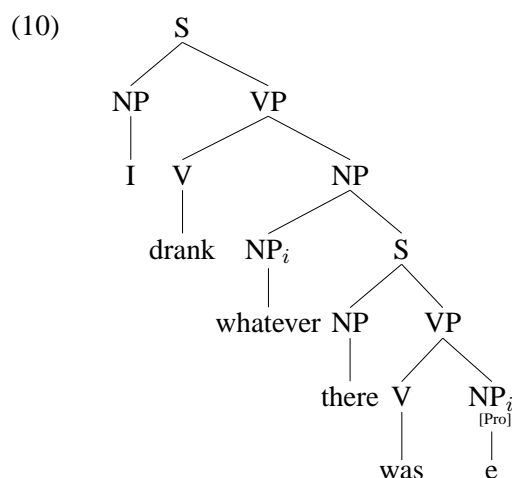
And finally, in (9) the referent of the non-specific free relative pronoun is the same as the “missing” object of the verb in the sister clause.

- (9) a. Han faldt i snak med hvem som helst, han mødte.  
 he fell into talk with whomever he met  
 ‘He started to talk to anybody he met.’  
 b. Han spiser hvad som helst han kan finde på vejen.  
 he eats whatever he can find on road.DEF  
 ‘He eats whatever he can find on the road.’

A property of the Danish examples is that when the referent is the same as the “missing” subject, the subject expletive *der*, ‘there’, is inserted in subject position in the sister clause. In Section 6 we will further investigate the distribution of the expletive subject in free relatives as well as the distribution of the Danish complementizer *som*.

## 4 Free relatives as *wh*-headed NPs

The accounts mentioned in Section 1 agree that free relatives behave as NPs externally. Bresnan and Grimshaw (1978) put forward further arguments that not only is a free relative an NP externally, but internally the *wh*-phrase is the head of the NP. The structure they assume is shown in (10).



Importantly, the *wh*-phrase is assumed to be the head of the NP and the relation between the *wh*-phrase and the gap in the sister clause is not a filler-gap dependency relation where the *wh*-phrase has been “extracted” from the sister clause. The *wh*-phrase and the gap in the sister clause are co-indexed by the process of Pro-deletion, cf. Bresnan and Grimshaw (1978, p. 370).

Bresnan and Grimshaw (1978) argue that a *wh*-head analysis explains the behaviour of English free relatives wrt. e.g. the matching effect, number agreement, the internal NP over S constraint, the independent generation of *wh*-ever phrases and PP pied piping. It should be noted, however, that the disallowance of PP Pied Piping in free relatives has been shown not to apply to all languages, cf. e.g. Müller (1999, p. 57) who also lists examples from Bausewein (1990).

The examples in (11) from Bresnan and Grimshaw (1978, p. 335) show the property that the category of the *wh*-phrase is the same as the category of the complement, e.g. *buy* requires an NP complement and *whatever* is an NP. The *wh*-head analysis predicts this matching effect.

- (11) a. I'll buy [<sub>NP</sub>[<sub>NP</sub> whatever] you want to sell]  
 b. John will be [<sub>AP</sub>[<sub>AP</sub> however tall] his father was]  
 c. I'll word my letter [<sub>AdvP</sub>[<sub>AdvP</sub> however] you word yours]

Also from Bresnan and Grimshaw (1978, pp. 339-339), the examples in (12) show that there is number agreement between the *wh*-phrase (or the phrase containing the *wh*-pronoun) and the verb. Number agreement is not found in interrogative clauses.

- (12) a. The books she has  $\left\{ \begin{array}{l} \text{are} \\ *is \end{array} \right\}$  marked up with her notes.  
 b. What books she has  $\left\{ \begin{array}{l} \text{isn't} \\ *arent't \end{array} \right\}$  certain.  
 c. Whatever books she has  $\left\{ \begin{array}{l} *is \\ \text{are} \end{array} \right\}$  marked up with her notes.

(13) illustrates the Internal NP Over S Constraint, again from Bresnan and Grimshaw (1978, p. 339). On the assumption that free relatives are NPs, (13c) is good because its structure of the internal, or non-peripheral, NP is [<sub>NP</sub> head  $\bar{S}$ ] rather than [<sub>NP</sub>  $\bar{S}$ ]<sup>2</sup>, i.e. NP over S, as is the structure of the questionable interrogative in (13b).

- (13) a. Can [<sub>NP</sub> the books [ $\bar{S}$  Mary bought]] be on the table?  
 b. ? Can [<sub>NP</sub> [ $\bar{S}$  whether you are right or not]] matter?  
 c. Can [<sub>NP</sub> what [ $\bar{S}$  you want] be on the table?

<sup>2</sup>Bresnan and Grimshaw (1978, p. 333) assume NP may expand into  $\bar{S}$  to account for interrogative clauses in NP positions.

(14) shows that non-specific *wh*-phrases can occur alone without a dependent sister clause, cf. Bresnan and Grimshaw (1978, pp. 339-340).

- (14) a. She wrote whenever possible.  
 b. She'll go wherever possible.  
 c. She vowed to do whatever possible to vindicate herself.

The examples support the base-generation of the *wh*-pronoun, as there is no sister clause from where it can have been extracted.

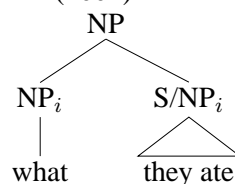
Finally, the examples in (15) show that free relatives do not allow PP pied piping. (17b) is ill-formed because on the assumption that the *wh*-phrase is the head of the free relative, a category mismatch occurs because the verb *reread* requires an NP, not a PP, cf. Bresnan and Grimshaw (1978, p. 342).

- (15) a. I'll read the paper which John is working on.  
 b. I'll read the paper on which John is working.  
 (16) a. I'll like to know which paper John is working on.  
 b. I'll like to know on which paper John is working.  
 (17) a. I'll reread whatever paper John has worked on.  
 b. \* I'll reread on whatever paper John has worked.

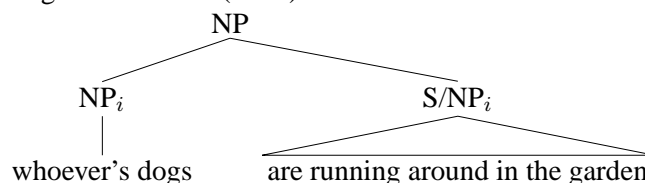
## 5 Previous HPSG *wh*-head analyses of free relatives

Kim (2001), Wright and Kathol (2003), Kubota (2003), Taghvaipour (2005) and Borsley (2008) all adopt the *wh*-head analysis. (18) through (22) show that these accounts all assume that there is a filler-gap dependency between the *wh*-phrase and a gap in the sister clause.

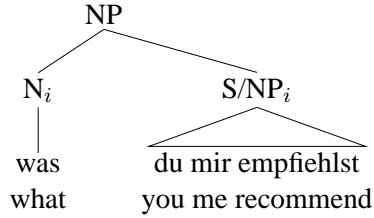
- (18) Kim (2001)



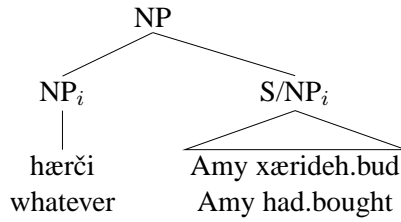
- (19) Wright and Kathol (2003)



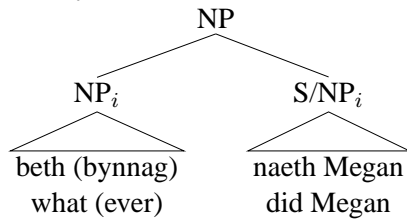
(20) Kubota (2003)



(21) Taghvaipour (2005)



(22) Borsley (2008)



The analyses differ in other respects, assuming e.g. different syntactic functions for the constituents involved. Kim (2001) assumes the clause to be a modifier whereas Kubota (2003) assumes it to be a complement. They also differ wrt. how the gap is bound off. In Kubota (2003) the gap is lexically bound off by the *wh*-phrase, whereas in the other accounts the gap is bound off by a head-filler phrase. Wright and Kathol (2003) introduces an F-REL feature which projects the content of the free relative pronoun to the NP containing it also in cases where the free relative pronoun is not the head of the extracted NP. In Section 6 we will show Danish data which cannot be captured by these analyses, justifying yet another structural account of free relatives.

## 6 The distribution of *der* and *som* in Danish relative head-filler constructions

We will now show that the distribution of *der*, ‘there’, and the complementizer *som* in free relatives is different from their distribution in bound *hv*-relative clauses where the *hv*-phrase binds off the gap.

When the *hv*-phrase and the missing subject in the sister clause corefer, *der* is obligatory in the free relative, (23), whereas the insertion of *der* in the bound relative clause reduces its acceptability, as shown in (24) and (25).



- (23) a. Vi skal tale om, hvad Bibelen siger om hvem *der* synder.  
we shall talk about what Bible.DEF says about who there sins  
'We will be talking about what the Bible says about who sins.'
- b. \*Vi skal tale om, hvad Bibelen siger om hvem synder.  
we shall talk about what Bible.DEF says about who sins
- (24) a. Jeg har en veninde hvis barn hedder Kastanje.  
I have a girl-friend whose child is called Chestnut  
'I have a girl-friend whose child is called Chestnut.'
- b. ?Jeg har en veninde hvis barn *der* hedder Kastanje.  
I have a girl-friend whose child there is called Chestnut  
'I have a girl-friend whose child is called Chestnut.'
- (25) a. Det er nødvendigt at redegøre for de egenskaber, hvilke danner  
it is necessary to account for the features which form  
baggrund for den biologiske opbygning  
background for the biological makeup  
'It is necessary to account for the features which are the basis of the  
biological makeup.'
- b. ?Det er nødvendigt at redegøre for de egenskaber, hvilke *der*  
it is necessary to account for the features which there  
danner baggrund for den biologiske opbygning  
form background for the biological makeup  
'It is necessary to account for the features which are the basis of the  
biological makeup.'

It is possible to use the complementizer *som* instead of the expletive. Again *som* is obligatory in the free relative, (26), whereas the insertion of *som* in the bound relative clause in this case makes it unacceptable, as shown in (27) and (28).

- (26) a. Malenes styrke er hendes evne til at skabe gode og trygge  
Malene's strenght is her ability to to create good and safe  
rammer for hvem, som er gæst i huset.  
frames for whom Comp is guest in house.DEF  
'Malene's strenght is her ability to create a good and safe environ-  
ment for whom is a guest in the house.'
- b. \*Malenes styrke er hendes evne til at skabe gode og trygge  
Malene's strenght is her ability to to create good and safe  
rammer for hvem er gæst i huset.  
frames for whom is guest in house.DEF

- (27) a. Jeg er respekteret af de sangere og musikere, hvis respekt  
I am respected by the singers and musicians whose respect  
betyder noget for mig.  
means something for me  
'I am respected by the singers and musicians whose respect matters  
to me.'
- b. \*Jeg er respekteret af de sangere og musikere, hvis respekt  
I am respected by the singers and musicians whose respect  
*som* betyder noget for mig.  
Comp means something for me
- (28) a. Hotellet tilbyder nem adgang til og fra Amsterdam Schiphol  
hotel.DEF offers easy access to and from Amsterdam Schiphol  
lufthavn, hvilken ligger omkring 15 km væk.  
airport which lies about 15 km away  
'The hotel offers easy access to and from Amsterdam Schiphol airport  
which is situated about 15 km away.'
- b. \*Hotellet tilbyder nem adgang til og fra Amsterdam Schiphol  
hotel.DEF offers easy access to and from Amsterdam Schiphol  
lufthavn, hvilken *som* ligger omkring 15 km væk.  
airport which Comp lies about 15 km away

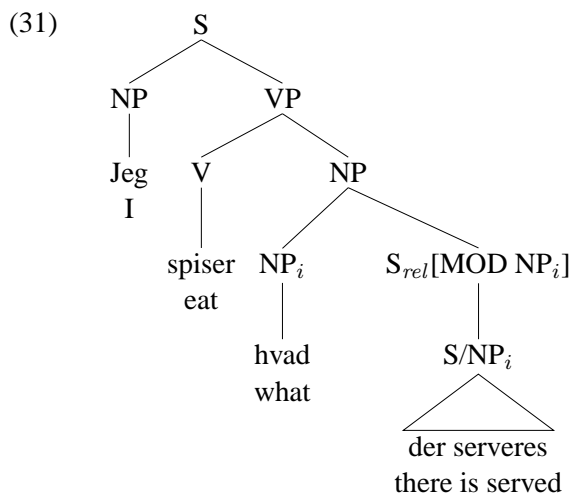
This distribution of *der* and *som* in Danish free relatives corresponds to their distribution in an entire relative construction with a nominal head and a bound non-*hv*-relative clause, as shown in (29) and (30).

- (29) a. Jeg går videre til den bog, *der* var grunden til, at jeg satte  
I go further to the book there was reason.DEF to that I sat  
mig til tasterne.  
myself to keys.DEF  
'I'll continue with the book that was the reason I began writing.'
- b. \*Jeg går videre til den bog var grunden til, at jeg satte  
I go further to the book was reason.DEF to that I sat  
mig til tasterne.  
myself to keys.DEF
- (30) a. Vælg den bog *som* falder mest i din smag!  
choose the book Comp falls most in your taste  
'Choose the book that you like the best!'
- b. \*Vælg den bog falder mest i din smag!  
choose the book falls most in your taste

As can be seen, *der* or *som* insertion occur in non-*hv*-relative clauses in Danish as in the sister clauses of free relative pronouns, suggesting that free relative constructions contain relative clauses modifying the free relative pronoun head.

## 7 The proposed analysis for Danish free relatives

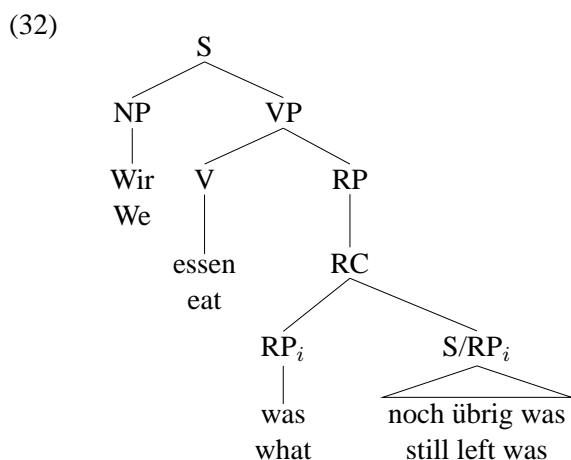
The data in Section 6 suggests that the structure of Danish free relatives does not involve a gapped clause and a free *hv*-phrase binding off the gap, as the structures presented in Section 5 propose. Instead we propose that the gap in the sister clause in a free relative is bound off before forming a constituent with the free relative pronoun, and hence the *hv*-phrase does not function as a filler-phrase. The *hv*-phrase is the head of an NP and the sister clause is a relative clause. (31) shows the structure for the free relative *hvad der serveres*, ‘what is served’.



We leave it for further research to explain why the relative clauses in specific free relative constructions are obligatory.

## 8 An alternative analysis

At this point we need to mention an alternative non-*wh*-head analysis proposed by Müller (1999). He assumes the structure in (32) for German free relatives.



Müller (1999) discusses the behaviour of German free relatives versus ordinary relatives wrt. extraposition. He gives the examples in (33) taken from Gross and van Riemsdijk (1981, p. 185).

- (33) a. Der Hans hat das Geld zurückgegeben, das er gestohlen hat.  
           the Hans has the money returned           that he stolen    has  
           ‘Hans has returned the money that he has stolen.’  
       b. \*Der Hans hat zurückgegeben das Geld, das er gestohlen hat.  
       c. Der Hans hat zurückgegeben, was er gestohlen hat.

The argument is that only clauses, not NPs, may appear in the extraposed position in the examples, suggesting that the free relative is a clause at some point in the derivation, as in the structure in (32).

(34) shows that we do find exceptions to the constraint on NP extraposition in Danish with somewhat decreased acceptability, though. The NPs in the examples are extraposed from the position between the verb and the particle. Thus the constraint on NP extraposition is not a clear-cut argument against the *hv*-head analysis for Danish, as we need to allow extraposed NPs, be they ordinary NPs or free relative constructions.

- (34) a. En excentrisk milliardær har gemt væk sine penge.  
           an eccentric billionaire has hidden away his money  
           ‘An excentric billionaire has hidden his money.’  
       b. Vi vil samle op de trafikplaner der allerede er udarbejdet.  
           we will pick up the traffic plans there already are drawn up  
           ‘We will gather the traffic plans that have already been drawn up.’  
       c. Du kan prøve at slette eller gemme væk de filer som de  
           you can try to delete or hide away the files Comp they  
           nævner her.  
           mention here  
           ‘You can try to delete or hide the files they mention here.’  
       d. Disse forhold betyder, at piloter er nødt til at gemme  
           these conditions mean that pilots are necessary to to store  
           væk deres dragefly.  
           away their dragon plane  
           ‘These conditions mean that pilots must store their dragon plane.’

Also, the examples in (35) contain free relatives with the sister clause of the *hv*-phrase extraposed.

- (35) a. Du kan slå hvad som helst op, der kan give krydshenvisninger  
 you can look whatever up there can give cross-references  
 til Brewster.  
 to Brewster  
 ‘You can look up anything that might provide cross-references to Brewster.’
- b. Klods-Hans samler hvad som helst op, som han tilfældigt  
 Numskull Jack picks whatever up Comp he accidentally  
 finder på vejen.  
 finds on road.DEF  
 ‘Numskull Jack picks up anything he accidentally finds on the road.’
- c. Han er parat til at køre hvem som helst ned, der står i  
 he is ready to to drive whomever down there stands in  
 vejen for ham.  
 way.DEF for him  
 ‘He is prepared to run down anybody who stands in his way.’

This is easily explained on an analysis where the free relative pronoun is the head of an NP and the extraposed clause an extraposed relative clause.

Another argument against the *wh*-head analysis for the German data is the occurrence of complex pied piping examples as the examples in (36), cf. Müller (1999, p. 57) and Pollard and Sag (1994, p. 69).

- (36) a. Wessen Birne noch halbwegs in der Fassung steckt, pflegt  
 whose nut yet halfway in the holder is uses  
 solcherlei Erloschene zu meiden.  
 such extinct to avoid  
 ‘Those who still have their wits half way about them tend to avoid such vacant characters.’
- b. Whoever’s dogs are running around in the garden is in big trouble

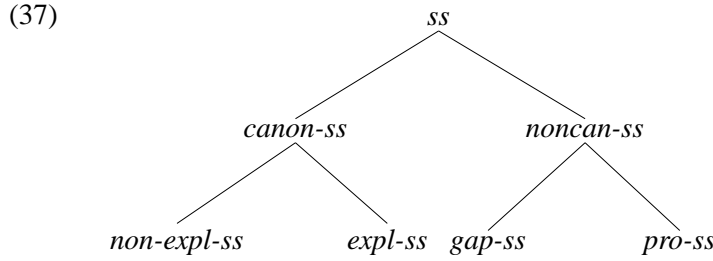
These examples contradict the *wh*-head analysis, as the noun head of the NP head does not agree in number with the verb of the main clause, rather it is the *wh*-phrase specifier which agrees with the main verb. However, Danish does not allow such complex pied piping examples, and hence the complex pied piping argument is also not clear-cut argument against the *hv*-head analysis for Danish.

## 9 Formalization

The formalization is based on Ginzburg and Sag (2000) and Sag (1997), relying on a *gap-ss* type representing the gap in the relative clause, the Argument Realization Principle excluding *gap-ss* arguments from the valence lists, the SLASH-Amalgamation Constraint determining the SLASH value of a word, the Generalized

Head Feature Principle propagating the SLASH value, and a filler-head phrase or constructional gap-binding finally binding off the gap. To account for the Danish expletive, the formalization further adopts the *expl(itive)-ss* type, the revised Argument Realization Principle for Danish and the Expletive SLASH Constraint proposed in Bjerre (2010), Bjerre (2011a) and Bjerre (2011b).

(37) shows the hierarchy of *synsem* types assumed in this analysis, cf. Bjerre (2011b, p. 281).



Importantly the *canon-ss* type is subtyped into an *expl(itive)-ss* and a *non-expl(itive)-ss*. The former is introduced to account for the expletive occurring in subject position when a subject is missing.

In (38) and (39) the constraints on the *gap-ss*, cf. Sag (1997, p. 446) and Ginzburg and Sag (2000, p. 170), and the *expl-ss*, Bjerre (2011b, p. 282), respectively are shown.

$$(38) \quad gap-ss \Rightarrow \left[ \begin{array}{l} \text{LOC } \boxed{1} \\ \text{SLASH } \{ \boxed{1} \} \end{array} \right]$$

$$(39) \quad expl-ss \Rightarrow \left[ \begin{array}{l} \text{LOC } \left[ \begin{array}{l} \text{CAT } | \text{ HEAD } expl \\ \text{CONT } \boxed{1} \end{array} \right] \\ \text{SLASH } \{ [ \text{CONT } \boxed{1} ] \} \end{array} \right]$$

The difference between the two *synsems* is that the *gap-ss* has neither syntactic nor semantic content of its own. Its SLASH value will appear in the SLASH set of its head. The *expl-ss*, on the other hand, has syntactic content of its own, i.e. the value of HEAD is the category *expl(itive)*. The *expl-ss* will appear on the SUBJ list of its head in addition to its SLASH value appearing in the SLASH set of its head. The analysis of expletives presented here assumes that expletives have a referential index, i.e. its structure shares its index with its filler.

In (40), the SLASH-Amalgamation Constraint from Ginzburg and Sag (2000, p. 169) is shown. The constraint determines the SLASH value of a head word by amalgamating all the SLASH values of its arguments.

$$(40) \quad word \Rightarrow \left[ \begin{array}{l} \text{SS } | \text{ SLASH } \boxed{\Sigma_1} \cup \dots \cup \boxed{\Sigma_n} \\ \text{ARG-ST } \left\langle [ \text{SLASH } \boxed{\Sigma_1} ], \dots, [ \text{SLASH } \boxed{\Sigma_n} ] \right\rangle \end{array} \right]$$

The Argument Realization Principle for Danish in (41), cf. Bjerre (2011b, p. 282), excludes *gap-ss* arguments from the valence lists. It also excludes *gap-ss* arguments from the SUBJ list, i.e. we analyze subject gaps as being extracted. But it does not exclude *expl-ss* arguments from the SUBJ list, even though they add an element to the SLASH set.

$$(41) \quad word \Rightarrow \left[ \begin{array}{l} \text{SUBJ } \boxed{A} \ominus list(gap-ss) \\ \text{SS} \mid \text{LOC} \mid \text{CAT} \left[ \begin{array}{l} \text{SPR } \boxed{B} \\ \text{COMPS } \boxed{C} \ominus list(gap-ss) \end{array} \right] \\ \text{ARG-ST } \boxed{A} \oplus \boxed{B} \oplus \boxed{C} \end{array} \right]$$

The SLASH value is propagated by the The Generalized Head Feature Principle from Ginzburg and Sag (2000, p. 33). The constraint is a default constraint and the value of SYNSEM is propagated unless some other constraint applies to bind off an element from the SLASH set.

$$(42) \quad hd-ph: \left[ \text{SYNSEM} / \boxed{1} \right] \longrightarrow \dots \mathbf{H} \left[ \text{SYNSEM} / \boxed{1} \right]$$

SLASH elements are bound off either by a subtype of the head-filler-phrase or any of its subtypes, or constructionally by the constraint in (43) or any of its subtypes, cf. Sag (1997, p. 36).

$$(43) \quad non-wh-rel-cl: \left[ \begin{array}{l} \text{HEAD} \mid \text{MOD } Nom_i \\ \text{SLASH } \{ \} \end{array} \right] \longrightarrow \mathbf{H} \left[ \text{SLASH } \{ NP_i \} \right]$$

Especially (43) is important to account for the Danish free relative constructions because it is this constraint which binds off the gap of the missing relative pronoun in the relative clause following the free relative pronoun.

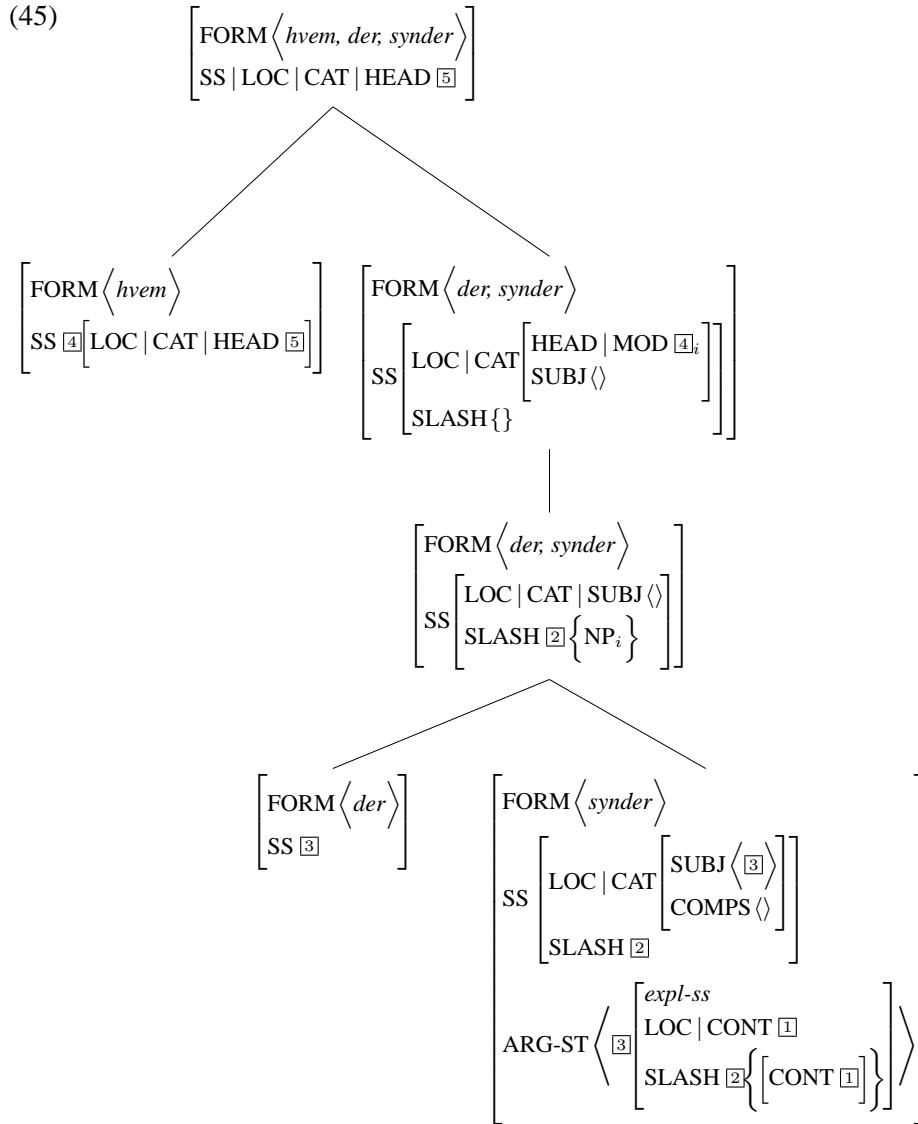
Finally, the insertion of the expletive in Danish relative clauses only happens in local extractions or when the pronoun supposed to be extracted is missing altogether. We therefore need a constraint to exclude SLASH values structure shared with expletive pronouns from being amalgamated by a head word. The *Expletive SLASH Constraint* for Danish is shown in (44), cf. also Bjerre (2011b, p. 283).

$$(44) \quad \neg \left[ \begin{array}{l} word \\ \text{ARG-ST} \left\langle \left[ \begin{array}{l} \text{LOC} \mid \text{CAT} \mid \text{HEAD} \mid \text{SUBJECT } \langle expl-ss_i \rangle \\ \text{SLASH } \{ \boxed{1}_i \} \uplus \boxed{\Sigma} \end{array} \right], \dots \right\rangle \end{array} \right]$$

(44) is a constraint on SLASH amalgamation in standard Danish. It ensures that heads cannot take clausal arguments with an expletive subject the corresponding

SLASH value of which has not been bound off. The constraint relies on a SUBJECT<sup>3</sup> feature. The *expl-ss* has been cancelled off from the SUBJ list and we need a way of knowing that the clause has an expletive subject. The constraint ensures that if a clause has an expletive subject, then the gap the expletive introduces has been bound off before the clause can function as an argument of some head word.

The representation of the free relative *hvem der synder*, ‘who there sins’, is shown in (45).



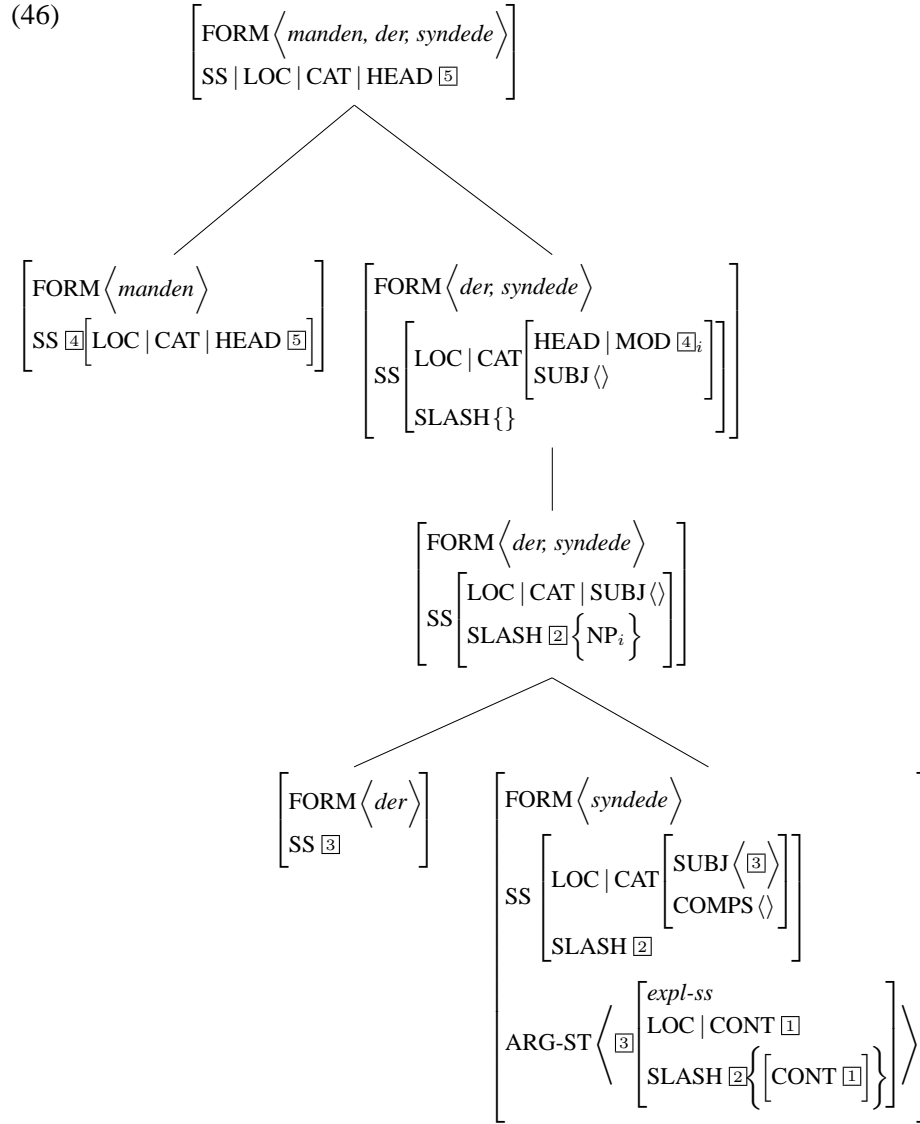
Importantly, the constraint in (43) projects the gapped clause into a relative clause which modifies the *hv*-phrase. This constraint binds off the gap in the clause.

<sup>3</sup>Cf. Meurers (1999) for a discussion of a HEAD feature for subjects. The SUBJECT feature is not represented in the remaining part of this paper, as it is not relevant to the present analysis.



The gap is formally represented by the expletive *der*, i.e. an *expl-ss*, which gives rise to a non-empty SLASH set on the verb.

In order to show that the analysis proposed for free relatives in Danish is similar to the analysis of ordinary relative constructions, the analysis of the relative construction *manden der syndede*, ‘man.DEF there sinned’, is shown in (46).



## 10 Conclusion

In this paper we have presented an analysis of Danish free relatives. We have followed Bresnan and Grimshaw (1978) and proposed a *hv*-head analysis assuming the *hv*-phrase to be the head of an NP. Also following Bresnan and Grimshaw

(1978) we have not assumed a filler-gap relation between the *hv*-phrase and the gap in the sister clause. Instead of assuming that Danish free relatives involve a gapped clause and a *hv*-filler, we have proposed that the gap in the sister clause is bound off by a constructional constraint and that the sister clause is analyzed as a relative clause of the *hv*-phrase head. In this way the analysis has been shown to differ from previous HPSG *wh*-head analyses of free relatives.

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